Suggested approach to charge control volume forecast error correction

Summary

The existing general charge control methodology of setting out a glidepath to a target set three years in advance is vulnerable to forecast error, particularly in relation to any future volume forecast made in circumstances where the relevant regulatory cost standard includes a recovery of fixed and common costs. The result of this can mean that where there is a consistent direction of volume forecast error the charge control could be set consistently above (or below) the underlying cost level for a number of years, giving rise to long-run windfall gains or losses. An over-recovery of fixed and common costs arising from conservative volume forecasts would appear to be one of the contributors to the above expected returns obtained by BT from regulated products (that has been observed by Frontier Economics).

This paper suggests a simple correction method to this over- or under-recovery that would bring the target charge in the third year of any charge control that is FAC or LRIC+ based closer to the level that would have obtained with a perfect volume forecast, by shifting from the base glidepath to alternative glidepaths that would have been selected with higher or lower volume forecasts than the base forecast. This "glidepath shift" could be applied to both single regulated products and a basket or sub-basket of multiple products. Given the fact that tools to test and adjust for glidepath shift are in fact already largely in place in the existing basket RPI – X control and compliance methodology, it would not be difficult to implement.

Existing charge control methodology

Since 1997 RPI +/- X glide path based charge controls to a pre-determined level at the end of the charge control period have been the favoured price control measure imposed by the regulator in UK telecoms. Sometimes charge controls are simple in design, with a limited number of products, in other instances they are more complicated with a range of second tier measures such as individual basket requirements, sub-caps or safeguard caps. Historically charge controls have included a complementary cost orientation remedy that places an obligation to ensure that each and every charge fairly reflects the underlying cost of provision. Overcharging disputes on cost orientation have resulted in this complementary remedy falling out of favour with Ofcom, leaving the charge controls as the sole pricing remedy where SMP has been found and consumers require regulatory price protection. The absence of a cost orientation back-stop allows over- or under-

recovery of costs where the actual volume outcome is materially different from that originally forecast.

At the start of a three year charge control period Ofcom sets a glide path for prices based on the expected level of underlying costs (the product of unit rates and volumes) at the end of the period. This glide to a targeted destination, whether fully allocated costs (FAC), or LRIC+ etc., is designed to eradicate any excess recovery over the period of the control, while still incentivising the regulated entity to behave efficiently and seek to minimise its costs over time by allowing it to retain any profits where the operator has managed to out-perform the pre-set path of the charge control. This incentive impact is the key reason charge controls are favoured over simple rate of return regulation (where prices are set at underlying costs + an allowable rate of return), thus providing the regulated entity with no incentive to minimise their cost of provision.

Implication of volume forecast error for a single regulated product

For ease of exposition, we first consider the position where there is a single regulated product with its own RPI[1] – X glidepath, and where the charge control is FAC or LRIC+, thus involving not only incremental cost recovery but also fixed and common cost recovery.

The common factor in charge control regulation has been that the target rate imposed at the end of the typically three year period has been set at or prior to the commencement of the three year period – in other words, of necessity, Ofcom is forecasting the level of the target rate three or more years ahead. With a number of variables in play in any cost modelling approach, Ofcom has a challenging job to forecast accurately the underlying costs of a range of often inter-dependent products three years hence. The biggest single issue that impacts unit cost predictions where the cost standard involves a recovery of fixed and common costs is generally volume forecasts.

Inevitably in the charge control, the level of the common cost recovery per unit is in effect set at an absolute value that is be recovered per unit in the third year (of the charge control). Other things being equal a difference between predicted and actual unit volumes will lead to the total value of common cost recovery being different from that actually required for that product. In this case, the operator will obtain super-normal profits (or losses) from the use of the regulated rate.

This is easy to illustrate in the following simplified example.

- Assume that regulated product ABC has in year 3 of a prospective charge control a calculated incremental cost of each unit of ABC of

[1] Or whatever appropriate inflation index is adopted

£10. But on top of this the fixed and common costs relevant to ABC is £100m in year 3, and the predicted number of units of ABC in use in year 3 is 1,000,000. It follows therefore that each unit must recover £100 of fixed and common costs as well as £10 of incremental costs: thus the regulated rate would be set at £110 per unit for year 3.

- But if the forecast has been set conservatively, as might be reasonably expected where doubt exists as to the level of future demand, and the actual outcome is 1,500,000 units of supply of ABC in the final year of the charge control rather than the forecast 1,000,000 units, then at a regulated price of £110, of which £100 is fixed and common cost recovery, the wholesale operator will have recovered £150m against an actual fixed and common cost of £100m. (For simplicity this assumes that the incremental cost of £10 is totally invariant to volume.)

- As a consequence in this final year of the charge control, the regulated operator will have recovered £50m more than is actually appropriate – this would be the level of super-normal profits.

- With perfect foreknowledge of the future volumes, the regulated rate would other things being equal have been set at £77 per unit rather than £110 in order to recover £100m of fixed and common costs across 1.5m units.

Generally Ofcom will have set a charge control using a glide path – as a consequence the levels discussed above will be those expected for the year 3 outcome, with the rates set in years 1 and 2 based on the difference between the year 0 rate (i.e. the exit rate from the year 3 of the previous charge control period) and the year 3 rate of the new charge control. Inevitably therefore if the year 3 outcome is different from the one forecast in the charge control workings, then there may very well have been over (or under) recoveries in the same direction as in year 3 in years 2 and 1 as well.

Frontier's post mortem of recent charge controls has identified that the divergence of forecast volumes assumed at the start of the controls and the actual volumes that transpire over the same period has resulted in BT in aggregate earning a significant amount in excess profitability. This excess has not been earned on merit, with BT acting efficiently to outperform its predicted cost base; rather it is through volume assumptions in the charge control model being wide of the mark. This allows BT to generate excess profits in its regulated business which can be used to compete against its downstream competitors and results in end consumers paying more. While it is true that the divergence between actuals and forecasted volumes also can result in charge controls undershooting the true cost per unit, reducing profitability

below BT's WACC, this phenomenon is far rarer as there is a natural caution reflected in charge control design around preventing a regulated business from not earning its WACC.

Duration of any volume forecast error

The problem however of forecast error and over- or under-recovery is not confined to a single three year cycle. The issue is compounded by the fact that as noted above inevitably the regulated charge in a given year is not based on a current view of the appropriate charge in that year, but on a view that is potentially three years out of date. If the forecast error persists, then so does the over-charge (or under-charge).

One can expect that the three year cycle is then repeated for the subsequent charge control. Generally the starting position for the next glidepath is the charge that is in place at the end of the previous charge control. But similarly this is not necessarily the underlying actual cost in that year, but rather a prediction that was made three years earlier as to what the level of cost in that year would be. Any consistent forecast error will then lead to a consistent over- or under-recovery against the charge control target over a sustained period. (It is only if the forecast varies from an over-recovery in one cycle to an under-recovery in the next that at some point the regulated charge will resemble to underlying cost.)

This can be illustrated by the following example, which assumes a regular 3 year charge control cycle for a single product.

- Assume a starting position of a three year charge control period of years 1 – 3. Sometime in year 3, a prediction of the correct underlying cost and hence the appropriate charge in year 6 will be made.

- Using this information, a glidepath will be set from the year 3 rate actually charged in the years 1 - 3 charge control of say £100 per unit, to the predicted year 6 rate of say £90, and applied in the charge control for years 4 - 6[2].

- Under these circumstances illustratively the year 4 – 7 glidepath from £100 to £90 might give a year 4 charge of £96.67, year 5 of £93.33, and in year 6 of £90.00.

- Let us then assume that the real level of underlying costs in year 3 was not the £100 set in year 0, but £95. So there would be an overcharge

[2] Note that this does not mean that the actual level of costs in year 3 was £100, but rather that this was the level determined three years previously in year 0 as the likely outcome. £100 may or may not be representative of the underlying level of costs in year 3.

in year 3 of £5. Furthermore, if the real underlying cost level was in reality trending from £95 in year 3 to £90 in year 6, this would mean that the charge for years 4, and 5 set by a glidepath from £100 to £90 would also be above appropriate levels.

- In year 6, assessment of the charge control levels for years 7 – 9 will be carried out. Assuming this determines that the year 9 rate is likely to be £75, then a glidepath from £90 to £75 will be set for years 7 – 9.

- But again what if the actual underlying cost for year 6, with the benefit of actual year 6 data, should have been £80, not the £90 calculated 3 years before?

- In this case the use of a glide-path from £90 to £75 for years 6 to 9, rather than £80 to £75, will give an unexpected over-recovery in years 7 and 8, as well as year 6.

- Similarly, if it subsequently emerges that the estimate of the cost in year 9 of £75, made in year 6 is too high, then the over-recovery will continue.

From this deliberately simplistic example, we can see that if the cost prediction made before the beginning of a 3 year charge control were to be always consistently above the actual cost outcome at the end of that charge control period, for example through conservative volume forecasts, then in every year in that charge control the rate set by the three year glidepaths will also be above the actual cost outcome. Furthermore this over-recovery would continue into the next 3 year charge control, unless and until there was a year in which the predicted level of costs matched the actual level of costs. At this point costs and recovery would be aligned.

(Obviously the reverse would apply as well – a consistent underestimate of the actual cost outcome would lead to a long-term under-recovery.)

Correcting a persistent over- or under-recovery

In order to adjust for this issue of forecast error giving rise to persistent super-normal profit recovery (or deficit), it is necessary for the level of the charge control to be adjusted at some stage inside each 3 year charge control period to a more recent prediction of the actual cost level than one that was made three years before.

The challenge for Ofcom is how to retain the incentive effects of a charge control and preserve the predicable price signalling that all market participants value to enable

the market to function effectively, preventing price shocks and preserving consumer confidence, whilst correcting away the potentially harmful impact of an inaccurate charge control, where the regulated entity is earning excessive profits without merit, having lost of much of the determination to behave as intended and outperforming the charge control through efficiency gains due to the cushion of profitability derived from volumes being off forecast.

There are two possible points where a correction might be done:

- Using the narrative from the example above, as part of the charge control work for say years 7 – 9, Ofcom could not only model the cost outcome in year 9, but also model, with current data, the actual cost level in year 6. Using the updated year 6 data, Ofcom could then set the glidepath for years 7 – 9 so that it runs not from the level of year 6 charges estimated in year 3, i.e. from the example above a level of £90, but from an improved starting point of the newly calculated actual cost for year 6 of £80. Here year 7 would not be £85 but approximately £78 and so on.

  The disadvantage of this approach is that it would significantly complicate Ofcom's work for the year 7 – 9 charge control, requiring the accurate setting of the level of costs in both years 6 and 9. But in addition an adjustment of this nature would lead not only to the elimination of any cost difference arising from volume variance, but also to potentially premature elimination of any efficiency savings that might be legitimately eligible to be recovered by the wholesale operator for a somewhat longer period.

- A simpler approach would be to allow the possibility that the rate charged in the final year of each set of charge control years could be quickly changed if it appeared that the assumptions underlying the original prediction of the costs in the final year were no longer valid. An adjustment could be made to bring the year 3, 6 or 9 charge closer to the real underlying cost, damping down the over-charge or under-charge in that year and also in the following years. We consider that such an approach is both practical and easy to implement, if it were to be confined to the single and most troublesome forecast variable, that of volumes.

Volume forecast error correction – single regulated product

To a very considerable extent, the ability to make a correction for a volume forecast error is already implicit in much of Ofcom's present modelling approach,

in that Ofcom frequently as part of its setting of a base target for a regulated product calculates a set of sensitivities, including those arising from volume changes, and on occasion for baskets extends these into a publication of alternative worked-out glidepaths under different volume assumptions.

For example in the leased line charge control consultation in 2012[3] Ofcom suggested for Ethernet products a base glidepath of RPI – 12%, but also noted in table 6.11 the existence of alternative volume forecasts and outcomes:

- If volumes were to be 10% lower than the base case, then the year 3 target would be higher than the base case, and the glidepath less steep at RPI – 9.5%[4].

- If volumes were to be 10% higher than the base case, then the year 3 target would be lower than the base case, and the glidepath necessarily steeper at RPI – 14%.

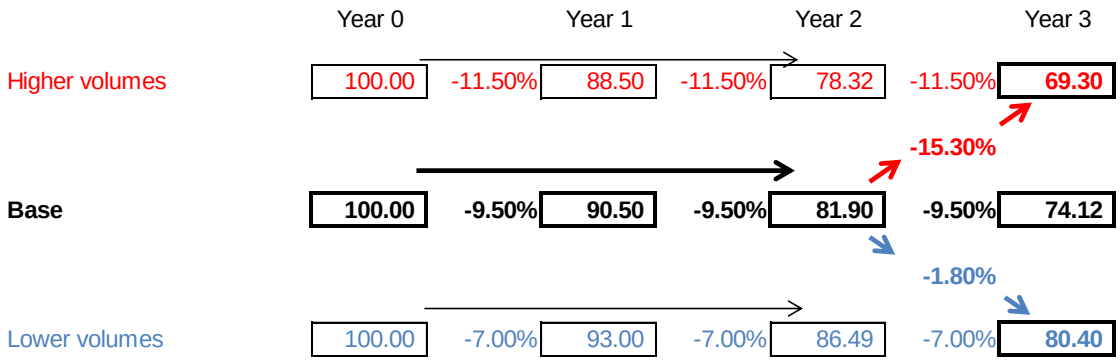
The existence of this "off-the shelf" alternative glidepath information suggests a simple resolution of the volume issue. If for example an updated view of volumes were taken in the middle of year 2 of the charge control period, and it were found that the volumes were trending above or below a particular trigger level of difference from the base forecast, then this could lead to a change in the year 3 charge by shifting from one glidepath destination to another.

So for example if it were found that the volumes were in fact trending 10% (or more) higher than assumed in the charge control forecast, then this might be a trigger to switch the year 3 calculated charge from the current RPI - 12% path to the level where it would have been under a RPI – 14% path.

We can show diagrammatically the paths of the base, and the alternative low and high glidepaths, assuming a constant RPI of 2.5% and a starting position of £100 per unit. (The year to year controlling percentages are shown as net of RPI – X, i.e. - 9.5% is equivalent to RPI – 12% where RPI is 2.5%.)

[3] Leased lines charge control, consultation July 2012

[4] Admittedly this actually refers to a basket of Ethernet products, but the point can be applied on an illustrative level to a single product. The issue of regulated product baskets is considered below



The diagram illustrates the point that the charge control would always continue along the base path until year 2. At this point it would be determined whether the volume forecast underlying the charge control was inside tolerance limits, in which case the default year 3 path would continue, or whether a glidepath shift to the red or blue paths is warranted.

- In this example, moving from year to year on the black path of the glidepath of the base situation adopted in the charge control of RPI - 12%, the controlling percentage[5] in each year would be - 9.5%, so in year 1 the rate will be £90.50, in year 2 £81.9 and in year 3 £74.12.

- But if it were established that the volumes were actually 10% (or more) higher than assumed, then the intention of the glidepath shift approach is that the year 3 charge would be set instead to the level it would have reached had the red path of the RPI – 14% glidepath been applied, i.e. with a controlling percentage of 11.5% from £88.50 in year 1, to £78.32 in year 2 to £69.3 in year 3. There is no suggestion that years 1 and 2 should be adjusted, simply that year 3 be switched to the targeted cost level that Ofcom would in practice have adopted in the first place with more perfect volume forecast data, i.e. to £69.3 rather than £74.12. This could be seen as the outcome of a percentage adjustment between year 2 and year 3 of -15.3%.

- Similarly if the actual volumes were 10% lower than the base forecast, then the year 3 rate should be set as if the blue path of the RPI – 9.5% glidepath had been applied, i.e. a controlling percentage of – 7%, to £80.4 in year 3 rather than £74.12 – this would involve a revised controlling percentage of -1.8% to shift from the base year 2 output of £81.90 to the alternative glidepath value of £80.40 in year 3.

[5] The net of RPI and – X. (Any geometric/arithmetic issues are ignored in this document.)

The charge for years 1 and 2 would in all three cases not change. This glidepath shift approach would be straightforward to implement. As the diagram shows all that would be necessary would be to adjust the year 3 controlling percentage from the base case to the percentage necessary to shift to either the blue or red paths, whose X value would be established as part of the overall charge control – once RPI is known, this calculation is simple.

The underlying principle being applied is that improved volume forecast data is allowing a switch from the base glidepath to the one that Ofcom would have adopted with improved foreknowledge, eliminating or at least damping down windfall gains or losses from volume variances, but allowing the rest of the original calculation to stand – so any efficiency gains that the operator is able to make would be maintained.

This correction is achieving two things:

- It brings the charge control for year 3 closer to the underlying level of cost, damping down in year 3 the outcome of any volume forecast error made in year 0;

- It also brings the starting position for the year 4 – 6 charge control closer to the appropriate level of cost, and thus is damping down the effect of the year 0 volume forecast error in years 4 and 5 as well as year 3.

Volume variance tolerances and glidepath shift triggers

Of course, the use of a plus or minus 10% trigger factor in the example above is only illustrative, and may well not be the most appropriate one to make in any particular market. In some markets volumes may be fairly predictable over time, with static or modest growth/decline in consumption occurring due to modest changes in demographics or macro-economic factors (e.g. exchange lines where demand is largely consistent over a control period). In other markets, typically business / enterprise services, demand is far less predictable. Thus the trigger levels and the alternative glidepath calculations would have to be tailored to each market (or more strictly to each basket) – but this is already implicitly done in part by Ofcom in its assessment of the appropriate base case and the establishment of relevant volume sensitivities. Very little additional work would be required by Ofcom to construct the alternative glidepaths.

- We would suggest that generally a symmetric approach be made to positive and negative volume variances, so there was one each of an above base volume and a below base volume alternative glidepath scenario developed. (Although in circumstance of substantial uncertainty

and high fixed and common cost recovery more than one alternative scenario in either direction could be adopted.)

- Potentially in a market, basket or product where there was very considerable uncertainty as to the likely volume outcome, it might be more appropriate to use a sliding scale of alternative glidepaths – for example "for every 10% by which the outcome differs from the forecast the glidepath should be adjusted by 2%".

- In a market with more perceived certainty as to volume the trigger might be a lower one, of say plus or minus 5% rather than 10%.

The advantage of this approach over a complete remodelling of the underlying year 3 costs is that it would take very little additional computation over and above that already done by Ofcom, and that it would provide a transparent and easily understood mechanism for all market participants and stakeholders. At the same time this adjustment would have the ability to correct in full or in part for the impact of forecast volume errors to prevent meritless over-recovery or harmful under-recovery.

Identifying the extent of the volume variance

In order for the approach to be implemented it would be necessary to obtain an updated view of volumes before the beginning of year 3. One way would be to require BT to provide actual volumes of the regulated service sold in at some point in year 2, for example at the mid-point of the year, taken from its management information systems. As we note below, in practice such (or similar) information is already shared between Ofcom and BT as an essential component of the existing RPI – X basket charge control methodology: the data is necessary for both rate setting and compliance assessment.

Two alternative approaches might be adopted here:

- The year 2 mid-point volume information could then be contrasted with the year 0 and year 1 volumes and an extrapolation performed to derive year 3 levels, to enable comparison with the original charge control estimate at that point in time. Then depending on the materiality of the difference, the charge control would either remain unchanged from its current trajectory or flex up or down to accommodate the disparity in volumes.

- Or as part of its original charge control work, Ofcom could derive a forecast of the volume in mid-year 2, and set trigger thresholds for a

variance from this level – so for example if the volumes mid-year 2 were in excess of 7.5% above or below the original mid-year 2 forecast, then year 3 would be shifted to the outcome of a year 3 volume variance of 10% above or below the year 3 forecast.

In either case there would be some risk of the unreliability of an 18 month forecast to predict the 24 – 36 month actual outcome, given that some of the relevant demand would be internal to BT, that could be brought forward or delayed to allow/prevent the trigger threshold being reached. For this reason it might be better not to have a simple on/off adjustment – rather any glidepath shift could be scaled approximately linearly in line with the degree of volume variance, restricting the gaming opportunities of a highly stepped approach. But this is largely a second-order implementation problem.

In the alternative, in the event of a significantly different outcome in year 3 from that implied by the mid-year 2 volumes then some retrospective adjustment could be made in year 4 if it proved that the wrong year 3 glidepath choice had been made. Similar retrospective adjustments where the operator has "inadvertently" under- or over-achieved the compliance target are not unknown, and are made possible by the "carry forward percentage" clause in charge controls.

Volume forecast error correction – multiple regulated products in one basket

In practice the Ethernet example used above on an illustrative basis is not a single product, but rather a number of individual products in a single regulated basket or sub-basket. This is in practice helpful in that in order to allow RPI – X regulation of a basket to function, Ofcom has already put in place a fairly complex method to allow for the overall basket of prices to change on a RPI - X basis, giving flexibility to individual product pricing, identifying volumes on an annual basis, using prior year volume weights to allow regulatory certainty, with an established compliance process which also includes carry forward adjustments to accommodate (symmetrically) compliance error/failure. With very limited adjustment, these existing tools for current basket regulation can also be used to identify the extent of any forecast error and implement the volume forecast error adjustment as well.

The existing basket approach makes use of the concept of accrued revenue for the basket as a whole – in effect it this represents the desired (or required) level of cost recovery. This is defined for a basket as product volumes multiplied by product charges, summed across all products in the basket. It is assessed in the first place from data from the previous year. For example:

"In this Condition 5.1, "Accrued Revenue" means, in any Relevant Year, the revenue deemed to be accrued in respect of a specific product or service calculated: (i) in respect of a rental product, by multiplying the volume of rentals as at 30 September preceding the start of the Relevant Year by the average charge (weighted according to the number of days during the 12 months preceding the start of the Relevant Year on which that charge applied) exclusive of discounts in the 12 months preceding the start of the Relevant Year; and (ii) in respect each product or service other than a rental product, by multiplying volumes supplied in the 12 months up to and including 30 September preceding the start of the Relevant Year by average actual charges exclusive of discounts in the 12 months preceding the start of the Relevant Year.[6]*"*

The method ensures that within the determined glidepath, the year on year change in calculated accrued revenue is consistent with that required by the RPI - X calculation, subject of course to the limitation of the use of prior year volume weights.

So as Vodafone understands it, if for example for year 3 rate setting purposes the initial accrued revenue in a basket is calculated at £275m, based as above on year 2 actual volumes multiplied by year 2 rates, then this becomes the starting point for the year 3 rate calculation. If the controlling percentage from the RPI - X calculation comes to a net - 9.5% between years 2 and 3, then the obligation on BT is to reduce the calculated accrued revenue for year 3 across the basket as a whole (measured this time on the year 2 volumes multiplied by actual year 3 charges) by 9.5% of £275m or £26m, and to demonstrate to Ofcom that it has done so.

This approach allows BT some discretion as to how to spread this overall target reduction between the products in a basket, allowing for different year on year volume changes between the products[7]. But the current basket approach is limited in that at present it only ensures that the level of RPI - X set from the three year old volume forecast has been adhered to. It does not establish whether, with the benefit of more up to date volume data the right level of X and hence the right glidepath has in fact been adopted.

So if for a given basket the sum of the overall volumes of products multiplied by their individual charges (i.e. in Ofcom terminology the accrued revenue) is significantly different from the total originally forecast (as a result of volume forecast error), it will mean that although compliance with the charge control is being achieved, overall super normal profits or losses are being made by the regulated company.

[6] BCMR statement, March 2013, at annex 7, condition 5.1 (n), page 132

[7] And the use of prior year volume weights permits forward looking compliance certainty (whilst also offering some additional revenue opportunity)

Identification of, and correction for this volume forecast error is the intent of the glidepath shift approach. The advantage of the current basket method is that the tools to test for and implement a glidepath shift are already largely in existence. All that is necessary is to compare the year 3 estimated cost recovery/accrued revenue made in the original Statement, i.e. made for year 3 in year 0 with a more current prediction of this value, and observe the variance.

We consider these two accrued revenue calculations separately below.

Accrued revenue for year 3 calculated in year 0

In order for a charge control to be set for a basket of products, it is necessary as part of the process to calculate an implied or actual accrued revenue (or expected/allowed cost recovery) target for year 3 to which the glidepath can then be aimed at. For example for the TI basket in the BCMR referred to above, Ofcom reports that :

> *"19.9 For the purposes of setting the value of X for the TI basket, we have forecast the costs associated with PPCs, RBS, Netstream 16 Longline and SiteConnect. For PPC rentals, our costs and revenues include both standard maintenance as well as enhanced maintenance, as set out in BT Wholesale's carrier price list. These services made up over 90% of the total TI market as reported in BT's RFS in 2011/12.*
>
> *19.10 Our cost forecasts are based on how different types of costs might vary with respect to the underlying volume changes, subject to assumptions such as efficiency, asset price changes and the WACC.*
>
> *19.11 We have determined what the revenues would be at the end of the charge control by multiplying service volumes by their respective prices. In effect, this is what the revenues would be in the absence of any price changes from current levels. We have then calculated the value of X so as to bring our forecast prices into line with forecast costs in the final year of the charge control.*[8]*"*

Assume that this resulting target/forecast accrued revenue in year 3 (as described in 19.10 above) is calculated in the charge control as £200m in the final base case adopted in the Statement. This would also mean that if weighted volumes were to be overall[9] 10% higher than the base case, then the actual accrued revenue achieved by the regulated operator would be £220m. Similarly if volumes were overall 10% lower than the base case, then the accrued revenue would be £180m.

[8] BCMR Statement March 2013
[9] On a weighted average basis

Assuming these values are calculated in year 0 real terms, they would need to be uplifted by three years of RPI to nominal year 3 values. If this were (using the methodology of the charge control) to be for example 10% in aggregate then this would mean that the base case accrued revenue in year 3 would be in nominal terms £220m, the low outcome £198m, and the high outcome £242m.

Accrued revenue for year 3 calculated in year 2

To examine whether a glidepath shift is necessary, a comparison between the accrued revenue estimates for year 3 made in year 0 and the actual accrued revenue for year 3 would then be made. The calculated basket accrued revenue for compliance purposes for year 3 readily gives an accrued revenue charge for year 3 that can be compared, with a little adjustment, with these measures of £198m, £220m and £242m.

If the contemporary calculation of revenue for year 3 (year 3 volumes multiplied by year 3 rates) were to comes out to a significantly different level from the historic inflation adjusted original target set in the charge control, then it would indicate that the wrong glidepath has been followed.

It is helpful that as discussed above the condition created for ensuring overall basket compliance already makes use of a volume measure and a calculation of accrued revenue, but because of the use of prior year weights, it is one year out of step. However it does provide a useful and relevant objective benchmark. The method uses for TI as noted above a volume snapshot taken on 30th September in the prior year.

In the illustrative example above the “original” year 3 accrued revenue based on year 2 volumes and year 2 rates was assumed to be £275m – the controlling percentage was assumed to be - 9.5%, so the “target” year 3 accrued revenue for the basket would be £249m. This value would of practical necessity already be calculated for present basket compliance purposes.

But this £249m would represent year 3 rates multiplied by year 2 volumes. In order to compare this value against the original charge control target, which obviously comprised forecast year 3 volumes multiplied by year 3 rates, some volume extrapolation would be necessary. This could potentially be from prior year volume trends or a similar objectively based method.

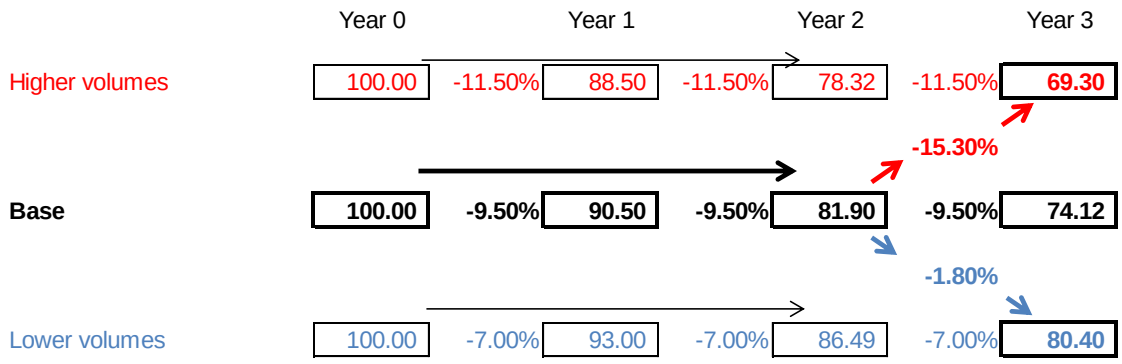
If we assume in the example that the resulting necessary volume adjustment between year 2 and year 3 is calculated as 4% upwards, this would mean that the best estimate of the likely achieved cost recovery using year 3 rates and year 3 volumes would be £249m plus 4%, or £259m.

Test for glidepath shift

This calculated "actual" accrued revenue/cost recovery for year 3 using year 3 rates and volumes can then be compared against the three alternatives predicted in year 0, calculated above as base case £220m, low case £198m, and high case £242m.

In this example it is obvious that the newly calculated year 3 recovery of £259m is above the high case threshold, so a shift to the high volume glidepath is necessary for year 3. Had the revenue been between £198m and £242m, no glidepath adjustment would be indicated – or in the alternative had the revenue been less than £198m a shift to the low volume glidepath would be required.

So, bringing back the diagram from above (assuming these are applicable to this particular basket), it can be seen that all that is necessary to shift to the red path is to adopt a -15.3% controlling percentage instead of the -9.5% default for the transition between year 2 and year 3.



This would require BT to adjust its year 3 rates so that the year 3 rates multiplied by year 2 volumes would give a 15.3% lower outcome than year 2 rates multiplied by year 2 volumes, so that where year 2 rates and volumes produced £275m, then the year 3 rates multiplied by the year 2 volumes would yield no more than £233m.

In practice assuming that year 3 volumes were 4% above year 2 volumes, the revenue BT would receive in year 3 would be £242m rather than £233m. Obviously this is still above the original charge control expectation, since the volume increase is somewhat above the 10% of the original high increase estimate but the revenue recovery is much closer to Ofcom's target than it would otherwise have been without the glidepath shift.

In the alternative, if it is felt that the extrapolation of volumes from year 2 to year 3 is too problematic then, as discussed in the sections above, the extent of reported variation of volumes in year 2 between actual and forecast could be

used as the trigger for the glidepath shift in year 3. So potentially a 7% year 2 volume variation could result in a shift to a glidepath for year 3 based on a 10% year 3 volume variation. Such detailed workings would have to be context specific.

Conclusion

Although all of this working appears somewhat convoluted, in practice it would entail only a minor increase in the complexity of the charge control compliance workings that are already undertaken by BT and Ofcom, and only for a single year. The charge control document in the original Statement would publicly identify the alternative values of X and their linkage with alternative year 3 volume levels. BT would have to show to Ofcom before the start of year 3, based on the existing compliance workings, whether the volume forecast error was sufficiently large that it needed to shift to an alternative glidepath. Exactly as at present, BT would then after year 3 has ended, be required to demonstrate compliance with the year 3 charge control.

All the information required to make the change would be contained and published on a single page. As all possible pricing outcomes for the entire control period would be known at the start of the control, this could be factored into retail pricing decisions and commitments to end customers.

While the arrangement would not eliminate all excess profitability that was earned without merit, it would reduce it significantly and avoid the situation where the forecasts used become more out of step as each month of the charge control passes.

It may be that the detailed implementation of the glidepath shift approach would be a little different from the suggestions made above – Vodafone is obviously restricted in its detailed understanding of the precise operation of basket charge controls. However we believe that the principle of the glidepath shift approach merits serious consideration by Ofcom as a means of obtaining a closer fit to the original charge control intentions of a regulated return.

Vodafone Ltd February 2015